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Abstract Title: The AstroBiology Explorer (ABE) MIDEX Mission Concept

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250 word Abstract:

The Astrobiology Explorer (ABE) is a MIDEX mission concept under study at NASA's Ames Research Center in collaboration with Ball Aerospace and Technologies Corporation. ABE will conduct IR spectroscopic observations to address important problems in astrobiology, astrochemistry, and astrophysics. The core observational program would make fundamental scientific progress in understanding the distribution, identity, and evolution of ices and organic matter in dense molecular clouds, young forming stellar systems, stellar outflows, the general diffuse ISM, HII regions, Solar System bodies, and external galaxies. The ABE instrument concept includes a 0.5m aperture Cassegrain telescope and two moderate resolution (R=2000-3000) spectrographs covering the 2.5-16 micron spectral region. Large format (1024x1024 pixel or larger) IR detector arrays and bandpass filters will allow each spectrograph to cover an entire octave of spectral range or more per exposure without any moving parts. The telescope will be cooled below 50 K by a cryogenic dewar shielded by a sun shade. The detectors will cooled to ~8 K. Two possible orbital configurations are being considered, a 1 AU Earth driftaway orbit and a low Earth orbit. The driftaway configuration requires a DeltaII launcher and provides a low thermal background, affords good access to the entire sky over the ~1 year mission lifetime, and allows adequate communications bandwidth. The LEO variant involves a higher thermal background and more restricted sky availability, but simpler communications and a smaller launch vehicle (Taurus). The spacecraft for both variants will be stabilized in 3 axes and will point to an accuracy of ~3 arcsecond.

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Dr. Kimberly Ennico is a Research Astrophysicist at NASA Ames Research Center. Previously she led integration and test of the SIRTF MIPS instrument and was Co-I on an NGST instrument design study for the University of Arizona.

Key Words: Astrobiology, Infrared, Spectrometer, Telescope, MIDEX, IR detectors